

ABSTRACT OF THE INVENTION

A hydrogen storage composite material having a Mg-Ni based alloy with a coating of a catalytically active metal deposited on at least a portion of a surface of said Mg-Ni based alloy. The coating is less than about 200 angstroms thick and preferably is formed from iron or palladium. The composite material is capable of adsorbing at least 3 weight percent hydrogen and desorbing at least 1 weight percent hydrogen at 30 °C. The Mg-Ni based alloy has a microstructure including both a Mg-rich phase and a Ni-rich phase, micro-tubes having an inner core of Ni-rich material surrounded by a sheathing of Mg-rich material, amorphous structural regions and microcrystalline structural regions.